

This Page Is Inserted by IFW Operations  
and is not a part of the Official Record

## **BEST AVAILABLE IMAGES**

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images may include (but are not limited to):

- BLACK BORDERS
- TEXT CUT OFF AT TOP, BOTTOM OR SIDES
- FADED TEXT
- ILLEGIBLE TEXT
- SKEWED/SLANTED IMAGES
- COLORED PHOTOS
- BLACK OR VERY BLACK AND WHITE DARK PHOTOS
- GRAY SCALE DOCUMENTS

**IMAGES ARE BEST AVAILABLE COPY.**

**As rescanning documents *will not* correct images,  
please do not report the images to the  
Image Problem Mailbox.**

**THIS PAGE BLANK (USPTO)**

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization  
International Bureau



(43) International Publication Date  
5 July 2001 (05.07.2001)

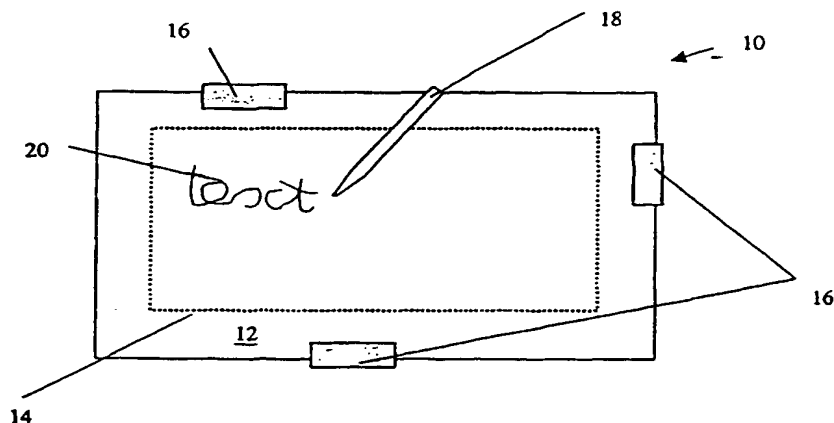
PCT

(10) International Publication Number  
**WO 01/48684 A3**

- (51) International Patent Classification: **G06K 11/14**
- (21) International Application Number: **PCT/GB00/04851**
- (22) International Filing Date:  
18 December 2000 (18.12.2000)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:  
9930404.0 23 December 1999 (23.12.1999) GB  
0025771.7 20 October 2000 (20.10.2000) GB
- (71) Applicant (for all designated States except US): **NEW TRANSDUCERS LIMITED [GB/GB]; 37 Ixworth Place, London SW3 3QH (GB).**
- (72) Inventor; and
- (75) Inventor/Applicant (for US only): **HILL, Nicholas, Patrick, Roland [GB/GB]; The Flat, 206 Cherry Hinton Road, Cambridge CB1 4AW (GB).**
- (74) Agent: **MAGUIRE BOSS; 5 Crown Street, St. Ives, Cambridgeshire PE27 5EB (GB).**
- (81) Designated States (national): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW.
- (84) Designated States (regional): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).
- Published:  
--- with international search report
- (88) Date of publication of the international search report:  
27 December 2001

[Continued on next page]

(54) Title: **CONTACT SENSITIVE DEVICE**



(57) Abstract: A method and apparatus using bending wave vibration to calculate information relating to a contact on a contact sensitive device (10). The method comprises the steps of providing a member in the contact sensitive device capable of supporting bending waves, providing means attached to the member for measuring bending wave propagation in the member to determine a measured bending wave signal and processing the measured bending wave signal to calculate information relating to the contact. The contact sensitive device (10) may comprise a transparent touch sensitive plate (12) mounted in front of a display device (14). A stylus (18) in the form of a pen may be used for writing text (20) or other matter on the touch sensitive plate (12). The transparent touch sensitive plate (12) may also be an acoustic device capable of supporting bending wave vibration. Three transducers (16) are mounted on the plate (12). At least two of the transducers (16) are sensing transducers or sensors and are thus sensitive to and monitor bending wave vibration in the plate.

WO 01/48684 A3



*For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*

## INTERNATIONAL SEARCH REPORT

Int. tional Application No

PCT/G6 00/04851

**A. CLASSIFICATION OF SUBJECT MATTER**  
IPC 7 G06K11/14

According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 G06K H04R

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ, IBM-TDB

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 856 820 A (WEIGERS DAVID G ET AL) 5 January 1999 (1999-01-05)  column 3, line 33 -column 4, line 32- ----	1,7-14, 16, 18-20, 23-27, 33,34, 37-39, 41-48, 50-52, 54-56
A	GB 2 301 217 A (NOKIA MOBILE PHONES LTD) 27 November 1996 (1996-11-27) abstract page 1, line 2 - line 4 ----- -/--	54,56

☒ Further documents are listed in the continuation of box C.☒ Patent family members are listed in annex.

## \* Special categories of cited documents :

- \*A\* document defining the general state of the art which is not considered to be of particular relevance
- \*E\* earlier document but published on or after the international filing date
- \*L\* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- \*O\* document referring to an oral disclosure, use, exhibition or other means
- \*P\* document published prior to the international filing date but later than the priority date claimed

- \*T\* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- \*X\* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- \*Y\* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- \*&\* document member of the same patent family

Date of the actual completion of the international search

9 July 2001

Date of mailing of the international search report

13/07/2001

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2  
NL - 2280 HV Rijswijk  
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,  
Fax: (+31-70) 340-3016

Authorized officer

Rydman, J

## INTERNATIONAL SEARCH REPORT

Int. l. Application No

PCT/GB 00/04851

## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5 628 031 A (KIKINIS DAN ET AL) 6 May 1997 (1997-05-06) column 7, line 36 - line 44 -----	56
A	US 5 412 189 A (CRAGUN BRIAN J) 2 May 1995 (1995-05-02) abstract -----	55
A	WO 97 09842 A (AZIMA HENRY ;HARRIS NEIL (GB): COLLOMS MARTIN (GB): VERITY GROUP P) 13 March 1997 (1997-03-13) the whole document -----	1-56

# INTERNATIONAL SEARCH REPORT

Information on patent family members

Int. Application No

PCT/GB 00/04851

Patent document cited in search report		Publication date	Patent family member(s)		Publication date
US 5856820	A	05-01-1999	JP	8263208 A	11-10-1996
GB 2301217	A	27-11-1996	CN	1146585 A	02-04-1997
US 5628031	A	06-05-1997	US	5835732 A	10-11-1998
			US	5412538 A	02-05-1995
			CN	1134757 A	30-10-1996
			EP	0746822 A	11-12-1996
			JP	9504397 T	28-04-1997
			WO	9512168 A	04-05-1995
			US	5634080 A	27-05-1997
			US	5600800 A	04-02-1997
			US	5579489 A	26-11-1996
			US	5590382 A	31-12-1996
			US	5522089 A	28-05-1996
			US	5689654 A	18-11-1997
			US	5537343 A	16-07-1996
			US	5708840 A	13-01-1998
			US	5615393 A	25-03-1997
			US	5793957 A	11-08-1998
			US	5812870 A	22-09-1998
			US	5721837 A	24-02-1998
			US	5692199 A	25-11-1997
			US	5799068 A	25-08-1998
			EP	0710431 A	08-05-1996
			WO	9503683 A	02-02-1995
US 5412189	A	02-05-1995	NONE		
WO 9709842	A	13-03-1997	AT	177579 T	15-03-1999
			AT	177574 T	15-03-1999
			AT	177580 T	15-03-1999
			AT	177575 T	15-03-1999
			AT	186617 T	15-11-1999
			AT	177581 T	15-03-1999
			AT	177582 T	15-03-1999
			AT	177583 T	15-03-1999
			AT	177578 T	15-03-1999
			AT	177576 T	15-03-1999
			AT	179297 T	15-05-1999
			AT	177577 T	15-03-1999
			AT	179563 T	15-05-1999
			AT	176826 T	15-03-1999
			AT	179045 T	15-04-1999
			AT	179296 T	15-05-1999
			AT	177281 T	15-03-1999
			AT	179564 T	15-05-1999
			AT	177282 T	15-03-1999
			AT	179043 T	15-04-1999
			AT	179044 T	15-04-1999
			AU	702865 B	11-03-1999
			AU	6880196 A	27-03-1997
			AU	702920 B	11-03-1999
			AU	6880296 A	27-03-1997
			AU	702867 B	11-03-1999
			AU	6880396 A	27-03-1997
			AU	703015 B	11-03-1999
			AU	6880496 A	27-03-1997

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/GB 00/04851

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 9709842 A		AU 702863 B	11-03-1999
		AU 6880596 A	27-03-1997
		AU 702873 B	11-03-1999
		AU 6880696 A	27-03-1997
		AU 702999 B	11-03-1999
		AU 6880796 A	27-03-1997
		AU 703061 B	11-03-1999
		AU 6880896 A	27-03-1997
		AU 703000 B	11-03-1999
		AU 6880996 A	27-03-1997
		AU 703071 B	11-03-1999
		AU 6881096 A	27-03-1997
		AU 703058 B	11-03-1999
		AU 6881296 A	27-03-1997
		AU 705592 B	27-05-1999
		AU 6881396 A	27-03-1997
		AU 703296 B	25-03-1999
		AU 6881496 A	27-03-1997
		AU 699890 B	17-12-1998
		AU 6881596 A	27-03-1997
		AU 703198 B	18-03-1999